

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号 *Publication #*
特開平7-202587

(43) 公開日 平成7年(1995)8月4日

08/04/1995
102 (b)

(51) Int.Cl.⁴

H 0 3 F 3/181

識別記号

庁内整理番号

B 8839-5J

F I

技術表示箇所

審査請求 未請求 請求項の数 2 F D (全 8 頁)

(21) 出願番号 特願平5-352589

(22) 出願日 平成5年(1993)12月29日

(71) 出願人 000223182

ティーオーエー株式会社

神戸市中央区港島中町7丁目2番1号

(72) 発明者 松谷 洋

兵庫県神戸市中央区港島中町7丁目2番1

号 ティーオーエー株式会社内

(74) 代理人 弁理士 田中 浩 (外2名)

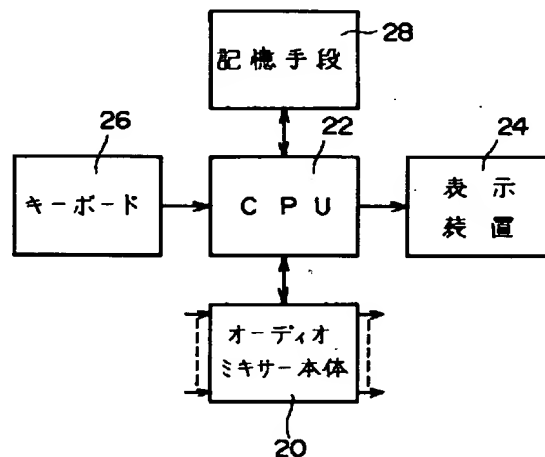
inventor Matsutani Hiroshi

(54) 【発明の名称】 オーディオミキサー装置におけるユニット接続関係表示装置

(57) 【要約】

【目的】 ダブルルーティングを容易に見出す。

【構成】 オーディオミキサー本体20を構成している複数のユニット間の接続情報を記憶手段28に記憶させ、各ユニットのうち任意のものをキーボード26によって指定すると、CPU22が、指定されたユニットから延びる信号経路中に存在する各ユニットを、記憶手段28の接続情報から検索し、この検索された各ユニットとこれらユニット間の接続関係を表示装置24に表示させる。



1

【特許請求の範囲】

【請求項1】 オーディオミキサー装置を構成している複数のユニット間の接続情報を記憶している記憶手段と、

上記各ユニットのうち任意のものを指定する指定手段と、上記指定手段によって指定された上記ユニットから延びる信号経路中に存在する各ユニットを上記記憶手段の接続情報から検索する検索手段と、

この検索された上記各ユニットとこれらユニット間の接続関係を表示する表示手段とを、具備するオーディオミキサー装置におけるユニット接続関係表示装置。

【請求項2】 請求項1記載のオーディオミキサー装置におけるユニット接続関係表示装置において、上記検索手段は、既に検索したユニットを再び検索した場合、上記表示手段に再検索したユニットを他の検索されたユニットと異なった状態で表示させることを特徴とするオーディオミキサー装置におけるユニット接続関係表示装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、複数の可聴周波数信号を混合して出力するオーディオミキサー装置において、このミキサー装置を構成している各ユニットの接続関係を表示する表示装置に関する。

【0002】

【従来の技術】オーディオミキサー装置には、例えば図9に示すように各種ユニットを結線するものがある。図9において、T1乃至T16は入力コネクタ、C1乃至C8は入力チャンネルユニット、G1乃至G5はグループチャンネルユニット、M1乃至M3はメインチャンネルユニットで、これら各ユニットは、いずれもボリューム、イコライザー、遅延装置等を有している。N1及びN2はモニターチャンネルユニットで、ボリューム等を有している。O1乃至O8は出力コネクタである。これら各ユニットは、使用状況に応じて任意に結線され、例えば図9に示すように結線される。このように、このオーディオミキサー装置は、各ユニットのみならず、入力コネクタや出力コネクタをも備えており、この入力コネクタと各ユニットとを結線したり、出力コネクタと各ユニットとを結線することもできるものである。

【0003】このようにそれぞれ結線された各ユニットから、いずれのユニットに出力信号が供給されているかを示すために、各ユニットには、結線される可能性のある各ユニットに対応させて、発光ダイオード等の発光素子を設け、実際に結線されたユニットに対応する発光ダイオードを発光させている。

【0004】例えば、図10(a)は入力チャンネルユニットC1を示し、これでは、結線される可能性のあるユニット、グループチャンネルユニットG1乃至G5に対応して、発光ダイオード1乃至5が設けられており、

2

実際に結線されているグループチャンネルユニットG1に対応する発光ダイオード1が発光している。同様に、図10(b)は、グループチャンネルユニットG1を示し、これでは結線される可能性のあるユニット、メインチャンネルユニットM1乃至M3に対応して、発光ダイオード6乃至8が設けられ、実際に結線されているメインチャンネルユニットM1に対応する発光ダイオード6が発光している。なお、両図において、9a、9bはボリューム摘み、10a、10bはイコライザー摘み、11a、11bは遅延装置摘みである。

【0005】しかし、このようなオーディオミキサー装置では、多数のユニットを結線するものであるので、ダブルルーティングが生じることがあった。ダブルルーティングとは、例えば図9における入力チャンネルユニットC2からの出力信号が、グループチャンネルユニットG1を介してメインチャンネルユニットM1に供給されると共に、グループチャンネルユニットG2を介してもメインチャンネルユニットM1に供給されているように、同一の信号が異なる信号経路を介して同一のユニットに供給されることである。

【0006】このようなダブルルーティングが生じると、例えば図9の入力チャンネルユニットC2の場合、入力コネクタT3からの入力信号が出力コネクタO1から異常に大きく再生されたり、グループチャンネルユニットG1、G2の特性差による干渉による入力端子T3からの入力信号が、出力コネクタO1から歪んで再生されたりする異音を検知されるので、ダブルルーティングが、どこかで生じていることが判明する。

【0007】この場合、まずモニターチャンネルユニットN1及びN2のうち出力コネクタO1に対応する発光ダイオードが発光しているモニターチャンネルユニットN1を探す。さらにメインチャンネルユニットM1乃至M2のうち、モニターチャンネルユニットN1に対応する発光ダイオードが発光しているモニターチャンネルユニットM1を探す。

【0008】このような作業を順次繰り返し、ようやく入力チャンネルユニットC2の出力信号がグループチャンネルユニットG1、G2の双方を介してメインチャンネルユニットM1に供給され、ダブルルーティングが生じていることが判明する。

【0009】

【発明が解決しようとする課題】しかし、このような作業によってダブルルーティングがどこで生じているかを探する場合、各ユニットの発光ダイオードのどれが発光しているかをいちいち確かめながら、結線をチェックしていかなければならず、その作業が非常に面倒であるという問題点があった。

【0010】

【課題を解決するための手段】上記の問題点を解決するために、本発明は、オーディオミキサー装置を構成して

50

いる複数のユニット間の接続情報を記憶している記憶手段と、各ユニットのうち任意のものを指定する指定手段と、この指定手段によって指定されたユニットから延びる信号経路中に存在する各ユニットを、記憶手段の接続情報から検索する検索手段と、この検索された各ユニットとこれらユニット間の接続関係を表示する表示手段とを、具備するものである。

【0011】また、検索手段は、既に検索したユニットを再び検索した場合、上記表示手段に再検索したユニットを他の検索されたユニットと異なった状態で表示させるものとする事ができる。

【0012】

【作用】本発明によれば、ダブルルーティングが生じている信号経路中にあると予測されるユニットを指定手段によって指定すると、検索手段が、記憶手段中の接続情報を検索し、指定されたユニットから延びる信号経路中に存在している各ユニットを探し出す。そして、表示手段には、探し出された各ユニットと、これらユニット間の接続関係が表示される。従って、この表示されている各ユニット間の接続関係を見ることによって、どこでダブルルーティングが生じているか発見することができる。また、検索手段が既に検索したユニットを再び検索した場合、即ち、ダブルルーティングが生じている場合、表示手段に再検索したユニットを他の検索されたユニットと異なった状態で表示させることによって、より簡単にダブルルーティングが生じているユニットを発見できる。

【0013】

【実施例】第1の実施例は、図1に示すようにオーディオミキサー本体20を有している。このオーディオミキサー本体20は、例えば図9に示したような入力コネクタT1乃至T16、入力チャンネルユニットC1乃至C8、グループチャンネルユニットG1乃至G5、メインチャンネルユニットM1乃至M3、モニターチャンネルユニットN1及びN2、出力コネクタO1乃至O8を有するものである。なお、オーディオミキサー本体20は、DSP（デジタル信号処理装置）によって構成することができる。

【0014】このオーディオミキサー本体20以外に、CPU22が設けられており、このCPU22には、CRT等によって構成された表示装置24が設けられている。また、CPU22には、キーボード26及びRAM等で構成された記憶手段28も設けられている。

【0015】記憶手段28には、図3に示すようにテーブル状の2つの記憶領域30、32が設けられている。記憶領域30は、各ユニット（入力及び出力コネクタを含む。以下、同じ）の出力側に対応する行と、各ユニットの入力側に対応する列とを有するマトリックス状に構成されており、このようなマトリックスを利用して、各ユニット間の接続関係を表している。

【0016】例えば入力コネクタT1と入力チャンネルユニットC1の入力側とが接続されている場合、T1に対応する行（第1行）とC1に対応する列（第17列）との交点の領域にフラグが立てられて、同様に入力コネクタT3と入力チャンネルユニットC2の入力側とが接続されている場合、入力コネクタT3に対応する行（第3行）とC2に対応する列（第18列）との交点の領域にフラグが立てられている。同様にして各ユニットの接続関係が記憶領域30に記憶されている。

【0017】記憶領域32は、各ユニットに対応させたフラグ領域を有するもので、後述するようにCPU22が、記憶領域30を検索する際に使用し、キーボード26によって指定されたユニットから出力される信号の信号経路上や、このユニットに入力される信号の信号経路上にあるユニットに対応するフラグ領域にフラグが立てられる。

【0018】CPU22は、例えばダブルルーティングが生じた場合、キーボード26の操作によって選択されたユニットの出力側を基点として延びている各信号経路中に存在しているユニットを、記憶手段28の記憶領域30のデータを検索して、検出し、その検出結果を表示装置24に表示すると共に、表示された各ユニット間の接続関係も表示装置24に表示する。

【0019】そのため、CPU22は、図2に示すフローチャートのように動作する。まず、記憶領域32をクリアし（ステップS2）、いずれかのユニットがキーボードによって指定されたか否かを判断する（ステップS4）。指定されていないと（ステップS4の判断がノーの場合）、判断がイエスになるまでステップS4を繰り返す。

【0020】ステップS4の判断がイエスになると、即ちいずれかのユニットが選択されると、選択されたユニットに割り当てられたユニット番号（図3参照）を、CPU22内に設けた記憶領域32の行のユニットの指定に使用するポインタNに記憶させ、このポインタNが指定するユニットに対応する記憶領域30のフラグ領域に、フラグを立て、さらに表示装置24上にポインタNが指定するユニットを表示する（ステップS6）。この選択されたユニットが、検索の基点となる。

【0021】そして、ポインタNの値が、全ユニットの数42より1大きい43に等しいか判断する、即ち全てのユニットがポインタNによって指定されたか判断する（ステップS8）。ステップS8の判断がイエスであると、この処理を終了する。

【0022】ステップS8の判断がノーであると、メモリ領域32においてポインタNが指定するフラグ領域にフラグが立っているか判断する（ステップS10）。この判断がイエスであると、このポインタNが指定しているユニットに接続されているユニットの検索を開始するために、メモリ領域30の各列を指定するポインタIの

5

値を1とする(ステップS12)。

【0023】次に、ポインタIの値が全てのユニットの数42よりも1大きい43であるか、即ち全てのユニットの列を指定したか判断する(ステップS14)。この判断がノーの場合、メモリ領域30のN行I列にフラグが立っているか、即ちN行のユニットとI列のユニットが接続されているか判断する(ステップS16)。

【0024】この判断がノーであると、ポインタIの値を1だけ増加させ(ステップS18)、ステップS14に戻り、ステップS16の判断がイエスになるまで、ス

テップS14、S16、S18を繰り返す。
【0025】ステップS16の判断がイエスであると、即ちN行のユニットとI列のユニットが接続されていると、ポインタIが指定しているユニットが、先に指定されたユニットに接続されていることを表すために、メモリ領域32におけるポインタIが指定しているユニットに対応するフラグ領域にフラグを立て、表示装置24上にポインタIが指定するユニットを表示し、これと先に表示したポインタNが指定するユニットとを結線表示する(ステップS20)。

【0026】そして、ステップS18以降を実行する。従って、ポインタNが指定するユニットに接続されているユニットが他にもあると、同様にして、これに接続されているユニットに対応する記憶領域32のフラグ領域にフラグが立てられ、かつ表示装置24に表示され、ポインタNによって指定されたユニットと結線表示される。

【0027】やがて、ポインタIによる全てのユニットの指定が終了すると(ステップS14の答えがノーになると)、ポインタNの値が1だけ大きくされ(ステップS22)、ステップS8以降を実行する。従って、ステップS8、S10、S22のループが実行されている間に、ポインタNの値が1ずつ大きくされ、そのたびにポインタNが指定する記憶領域32内のフラグ領域にフラグが立っているか、即ちポインタNが指定しているユニットは、先に検索されたユニットに接続されているユニットであるか判断され、そうであると、ステップS12、S14、S16、S18、S20のループが実行されて、このユニットに接続されているユニットが検索される。

【0028】例えば図4に示すように、キーボード26によって入力コネクタT3を指定すると、表示装置24には先ず入力コネクタT3が表示され、次に入力チャンネルユニットC2が表示され、T3とC2とが結線表示される。次に、グループチャンネルユニットG1が表示され、G1とC2とが結線表示される。そして、グループチャンネルユニットG2が表示され、G2とC2とが結線表示される。

【0029】次にメインチャンネルユニットM1が表示され、G1とM1とが結線表示される。そして、再びメ

6

インチャンネルユニットM1が表示され、G2とM1とが結線表示される。以下、同様にして入力コネクタT3を基点とする出力コネクタ側に向かう信号経路中に存在する各ユニットとこれらの結線関係が表示される。そして、この表示から入力チャンネルユニットC2がグループチャンネルユニットG1、G2を介してダブルルーティングされていることが明らかになる。

【0030】図5及び図6に第2の実施例を示す。第1の実施例では、図4から明らかなように指定されたユニットを基点としてこれから出力側に延びる信号経路中に存在している各ユニットを表示したが、第2の実施例では、図6から明らかなように指定されたユニットを基点としてこれから入力側に延びる信号経路中に存在する各ユニットを表示するものである。なお、図6ではメインチャンネルユニットM1を基点としている。

【0031】そのため、第1の実施例では、ポインタNは、記憶領域32の行を指定するのに使用していたが、第2の実施例では列を指定するのに使用しており、同様にポインタIは第1の実施例では列を指定するのに使用していたが、第2の実施例では行を指定するのに使用されている。また、第1の実施例では、ステップS8、S16、S22を使用していたのに対し、第2の実施例では、ステップS8a、S16a、S22aを使用している。

【0032】ステップS8aは、ポインタNの値が0であるか判断するもので、ステップS22aはポインタNの値を1ずつ減少させるものである。これらは、基点とされたユニットから入力側に検索するためのものである。

【0033】また、ステップS16aは、メモリ領域30のポインタIが指定する行と、ポインタNが指定する列との交点の領域にフラグが立っているか判断するものである。これも、基点とされたユニットから入力側に検索するためである。

【0034】このようにしているので、図6に示すように、例えばメインチャンネルユニットM1をキーボード26で選択すると、メインチャンネルユニットM1が表示され、次にグループチャンネルユニットG1が表示され、M1とG1とが結線表示され、次にグループチャンネルユニットG2が表示され、M1とG2とが結線表示され、次にグループチャンネルユニットG3が表示され、M1とG3とが結線表示される。以下、同様にして各入力コネクタT1、T3、T5、T7、T9、T10、T11までメインチャンネルユニットM1を基点とする信号経路中に存在する各ユニットが表示され、これらの間の結線状態も表示される。その結果、入力チャンネルユニットC2が、グループチャンネルユニットG1、G2を介してメインチャンネルユニットM1に接続され、ダブルルーティングが生じていることが判明する。

7

【0035】なお、上記の両実施例におけるステップS20は、例えば図7に示すように変形することができる。ダブルルーティングが生じていると、ステップS16またはS16aにおいて、先に検索されたユニットと接続されていると判断されたユニット（ポイントIが指定している）に対応する記憶領域32のフラグ領域には、既にフラグが立っている。

【0036】そこで、ステップS16またはS16aに続くステップS22において、ポイントIが指定しているユニットに対応するメモリ領域32のフラグ領域にフラグが立っているか判断し、立っていると、ステップS24において、このポイントIが指定しているユニットの表示装置24における表示を異なったものとし、ポイントNが指定しているユニットと結線表示する。

【0037】異なった表示としては、例えば図8に示すように、通常には、各ユニットを枠で囲い、その中にユニット名を表示していたなら、枠を表示しないで、ユニット名だけを表示するものとすることができる。また、枠及び（または）ユニット名を点滅表示させてもよい。

【0038】また、ステップS22の判断がノーであると、即ちダブルルーティングの部分でないと、ステップS20と同様な処理を行って通常の表示を行う（ステップS26）。

【0039】第1の実施例では、基点となるユニットから出力側に延びる信号経路中の各ユニットを表示し、第2の実施例では、基点となるユニットから入力側に延びる信号経路中のユニットを表示したが、両者を同時に表示するようにすることもできる。

【0040】

【発明の効果】以上のように、本発明によれば、選択されたユニットから延びる信号経路中の各ユニットを表示

8

し、各ユニット間の結線状態を表示するように構成したので、ダブルルーティングが生じていることを容易に見することができる。また、このように表示するために、各ユニットの接続情報を検索した際に、既に検索されたユニットが再度検索された場合、そのユニットがダブルルーティングを起こしていると推測されるので、このユニットの表示を他のものと代えることによって、より容易にダブルルーティングが生じている箇所を発見することができる。

10 【図面の簡単な説明】

【図1】本発明の第1の実施例のブロック図である。

【図2】同第1の実施例のフローチャートである。

【図3】同第1の実施例で使用するメモリの内容を示す図である。

【図4】同第1の実施例における表示を示す図である。

【図5】同第2の実施例のフローチャートである。

【図6】同第2の実施例における表示を示す図である。

【図7】同第1及び第2の実施例の変形例のフローチャートである。

20 【図8】図8の変形例における表示を示す図である。

【図9】オーディオミキサー装置における各ユニットの結線状態を示す図である。

【図10】従来のオーディオミキサー装置に使用されているユニットの正面図である。

【符号の説明】

20 オーディオミキサー装置

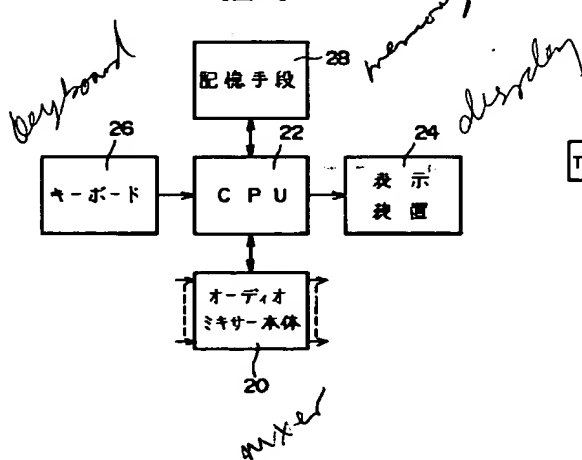
22 CPU（検索手段）

24 表示装置（表示手段）

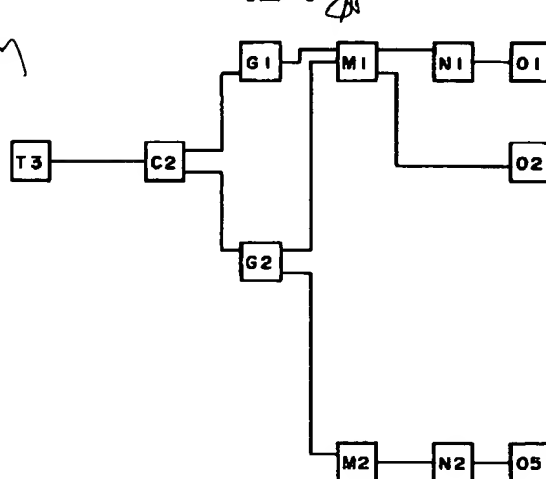
26 キーボード（指定手段）

30 28 記憶手段

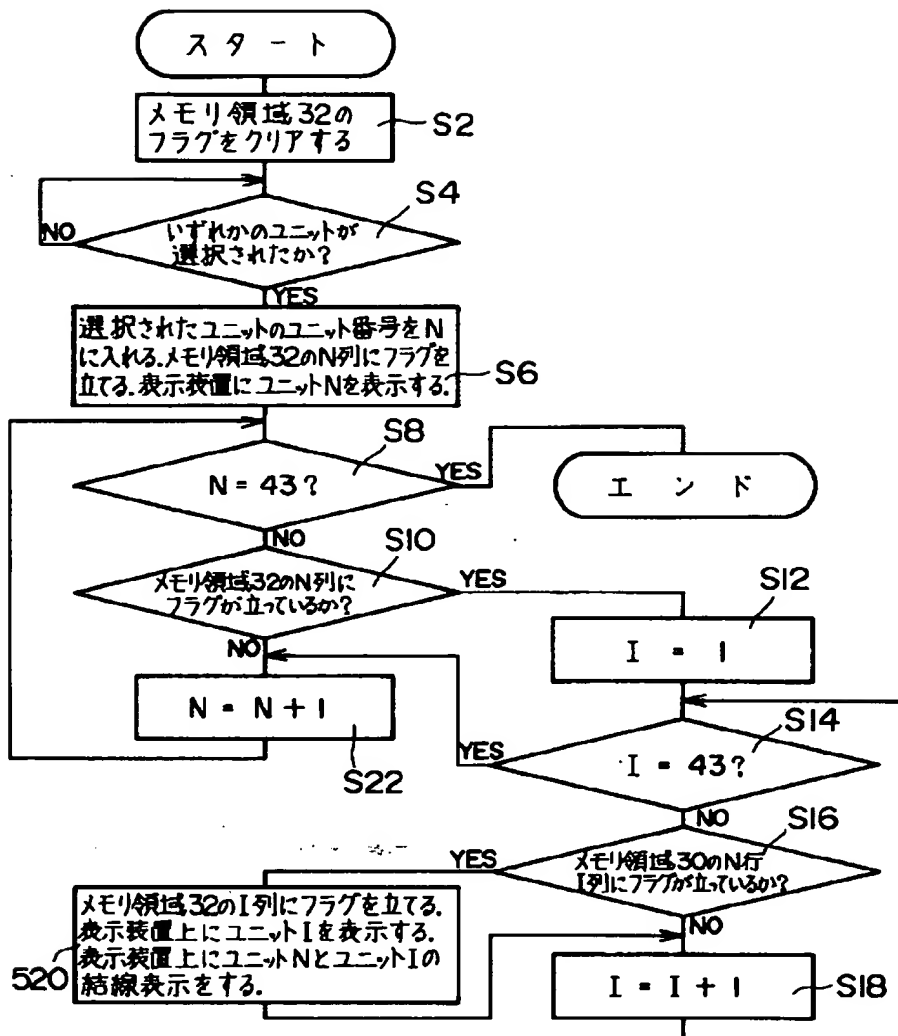
【図1】



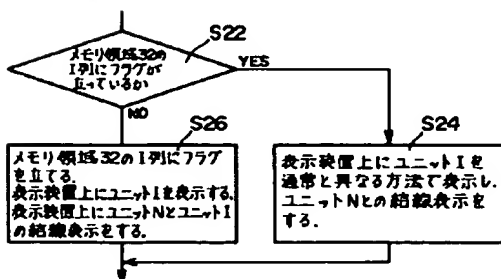
【図4】



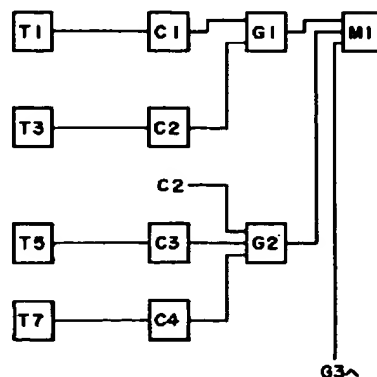
【図2】



【図7】



【図8】



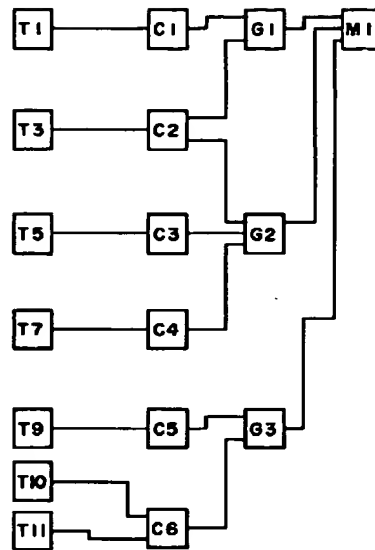
【図3】

28

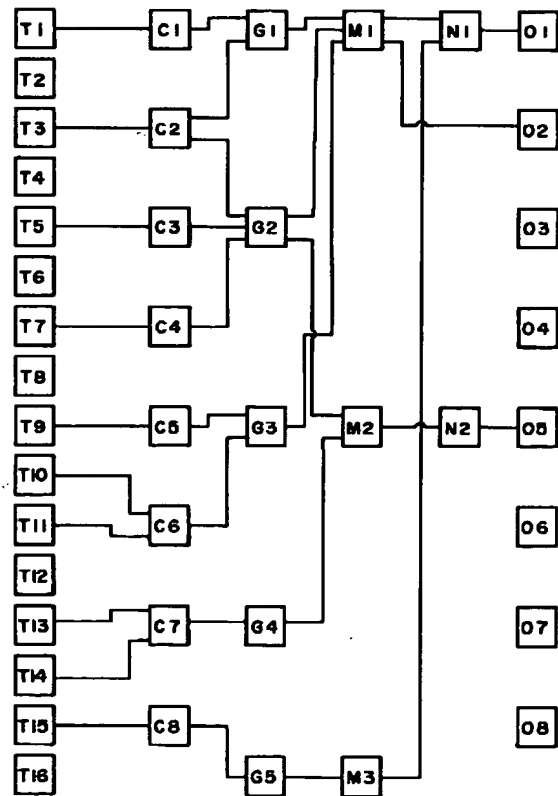
ユニット 番号	1	2	3	4	5	6		41	42
ユニット名	T1	T2	T3	T4	T5	T6		07	08
フラグ			/						

ユニット 番号	1	2	3		17	18		41	42
ユニット名	T1	T2	T3		C1	C2		07	08
1	T1				I				
2	T2								
3	T3					I			
17	C1								
18	C2								
41	07								
42	08								

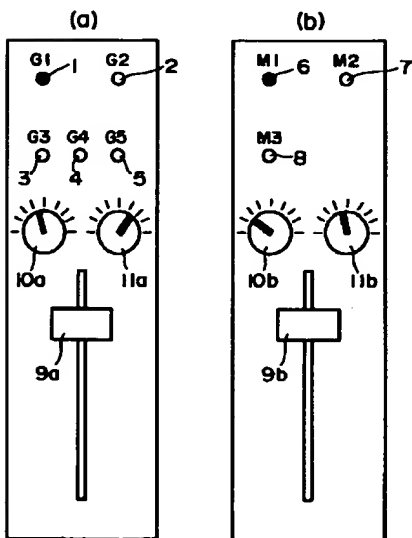
【図6】



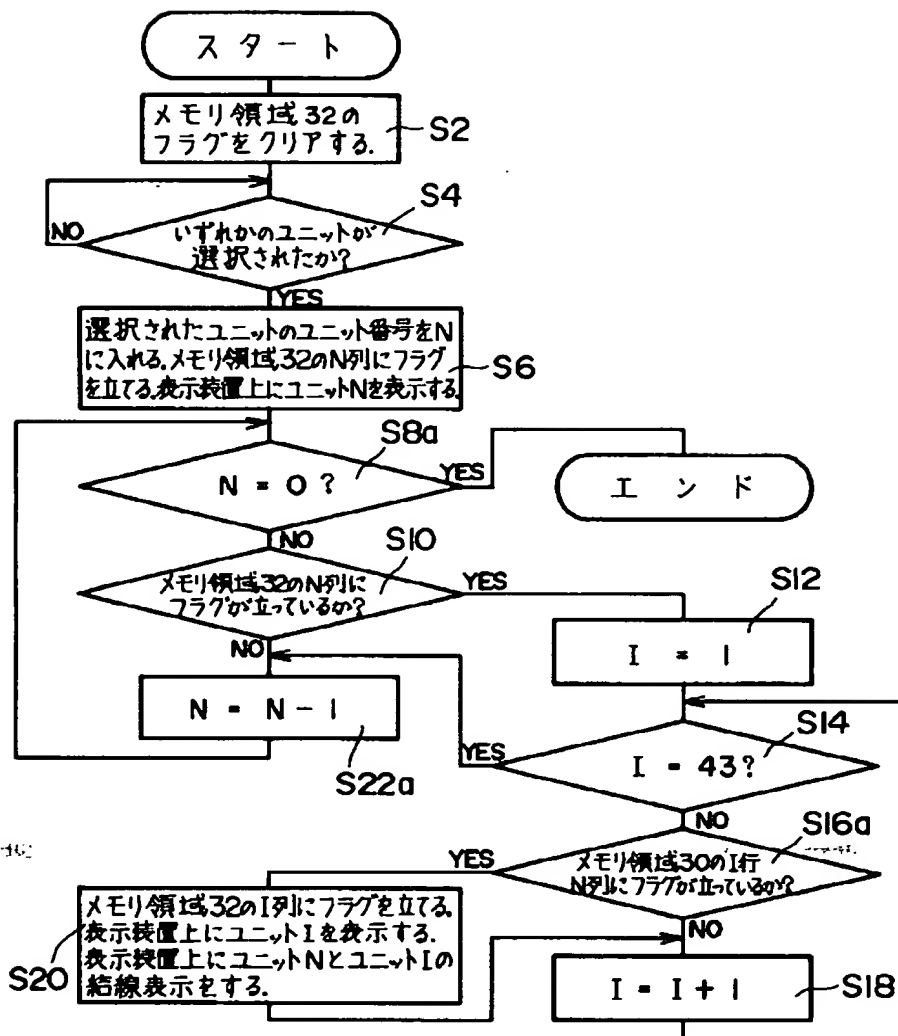
【図9】



【図10】



【図5】



CLAIMS

[Claim(s)]

[Claim 1] A storage means by which the initial entry between two or more units which constitute audio mixer equipment is memorized, A retrieval means to search each unit which exists in the signal path prolonged from the above-mentioned unit specified by assignment means to specify the thing of arbitration among each above-mentioned unit, and the above-mentioned assignment means from the initial entry of the above-mentioned storage means, The unit connection relation display in the audio mixer equipment possessing a display means to display the connection relation between each of this searched above-mentioned unit and these units.

[Claim 2] It is a unit connection relation display in the audio mixer equipment characterized by to display the unit re-searched for the above-mentioned display means in the condition differed from the unit with which others were searched when the unit which already searched the above-mentioned retrieval means in the unit connection relation display in audio mixer equipment according to claim 1 is searched again.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the display which displays the connection relation of each unit which constitutes this mixer equipment in the audio mixer equipment which mixes and outputs two or more audio frequency signals.

[0002]

[Description of the Prior Art] There are some which connect various units as shown in drawing 9 in audio mixer equipment. In drawing 9, for T1 thru/or T16, as for an input channel unit, G1, or G5, an input connector, C1, or C8 is [a group channel unit M1, or M3] the Maine channel unit, and each of each [these] units has volume, the equalizer, the delay unit, etc. N1 and N2 are monitor channel units, and they have volume etc. O1 thru/or O8 are output connectors. As connection is carried out to arbitration according to an operating condition, for example, it is shown in drawing 9, connection of each [these] unit is carried out. Thus, this audio mixer equipment is equipped not only with each unit but with an input connector and an output connector, and this input connector and each unit can be connected, or it can also connect an output connector and each unit.

[0003] Thus, in order to show whether the output signal is supplied to which unit from each unit by which connection was carried out, respectively, each unit is made to correspond to each unit by which connection may be carried out, light emitting devices, such as light emitting diode, are prepared in it, and the light emitting diode corresponding to the unit by which connection was actually carried out is made to emit light.

[0004] For example, drawing 10 (a) shows the input channel unit C1, corresponding to the unit by which connection may be carried out, the group channel unit G1, or G5, a light emitting diode 1 thru/or 5 are prepared, and, now, the light emitting diode 1 corresponding to the group channel unit G1 by which connection is actually carried out is emitting light. Similarly, drawing 10 (b) shows the group channel unit G1, corresponding to the unit by which connection may be carried out, the Maine channel unit M1, or M3, a

light emitting diode 6 thru/or 8 are prepared, and, now, the light emitting diode 6 corresponding to the Maine channel unit M1 by which connection is actually carried out is emitting light. In addition, in both drawings, 9a and 9b are [an equalizer knob, and 11a and 11b of a volume knob, and 10a and 10b] delay-unit knobs.

[0005] However, with such audio mixer equipment, since many units are connected, double routing might arise. Double routing is that the same unit is supplied through the signal path from which the same signal differs as the Maine channel unit M1 is supplied through the group channel unit G2, while the output signal from the input channel unit C2 in drawing 9 is supplied to the Maine channel unit M1 through the group channel unit G1.

[0006] Since the allophone by which the input signal from input connector T3 is greatly reproduced unusually from the output connector O1, or the input signal from input terminal T3 by interference by the property difference of the group channel units G1 and G2 is reproduced by being distorted from the output connector O1 will be detected when it is the input channel unit C2 of drawing 9 , for example if such double routing arises, it becomes clear that double routing has arisen in somewhere.

[0007] In this case, the monitor channel unit N1 to which the light emitting diode corresponding to the output connector O1 is emitting light among the monitor channel units N1 and N2 first is looked for. The monitor channel unit M1 to which the light emitting diode corresponding to the monitor channel unit N1 is furthermore emitting light the Maine channel unit M1 thru/or among M2 is looked for.

[0008] Such an activity is repeated successively, the output signal of the input channel unit C2 is supplied to the Maine channel unit M1 through the both sides of the group channel units G1 and G2 at last, and it becomes clear that double routing has arisen.

[0009]

[Problem(s) to be Solved by the Invention] However, when it was looked for where double routing has arisen according to such an activity, connection had to be checked with slight accuracy one by one, and there was [which / of the light emitting diode of each unit / is emitting light, and] a trouble that the activity was very troublesome.

[0010]

[Means for Solving the Problem] A storage means by which the initial entry between two or more units from which this invention constitutes audio mixer equipment in order to solve the above-mentioned trouble is memorized, A retrieval means to search each unit which exists in the signal path prolonged from the unit specified by assignment means to specify the thing of arbitration among each unit, and this assignment means from the initial entry of a storage means, A display means to display the connection relation between each of this searched unit and these units is provided.

[0011] Moreover, a retrieval means shall display the unit re-searched for the above-mentioned display means in the condition of having differed from the unit with which others were searched, when the already searched unit is searched again.

[0012]

[Function] If the unit predicted to be in the signal path which double routing has produced is specified with an assignment means according to this invention, a retrieval means will discover each unit which exists in the signal path which searches the initial entry in a storage means and is prolonged from the specified unit. And the connection relation between each discovered unit and these units is displayed on a display means.

Therefore, it can discover where double routing has arisen by seeing the connection relation between each of this unit currently displayed. Moreover, when a retrieval means searches the already searched unit again (i.e., when double routing has arisen), the unit which double routing has produced more simply can be discovered by displaying the unit re-searched for the display means in the condition of having differed from the unit with which others were searched.

[0013]

[Example] The 1st example has the body 20 of an audio mixer, as shown in drawing 1. This body 20 of an audio mixer has the input connector T1 as shown in drawing 9 thru/or T16, the input channel unit C1 or C8, the group channel unit G1 or G5, the Main channel unit M1 or M3, the monitor channel units N1 and N2, the output connector O1, or O8. In addition, DSP (digital-signal-processing equipment) can constitute the body 20 of an audio mixer.

[0014] CPU22 is formed in addition to this body of audio mixer 20, and the display 24 constituted by CRT etc. is formed in this CPU22. Moreover, the storage means 28 which consisted of a keyboard 26, RAM, etc. is also formed in CPU22.

[0015] As shown in drawing 3, the table-like two storage regions 30 and 32 are established in the storage means 28. A storage region 30 is each unit (an input and an output connector are included.). It is constituted in the shape of [which has a line corresponding to an output side / being the same / and a train corresponding to the input side of each unit hereafter] a matrix, and the connection relation between each unit is expressed using such a matrix.

[0016] For example, when the input connector T1 and the input side of the input channel unit C1 are connected, A flag is set to the field of the intersection of the line (the 1st line) corresponding to T1, and the train (the 17th train) corresponding to C1. When input connector T3 and the input side of the input channel unit C2 are connected similarly, the flag is set to the field of the intersection of the line (the 3rd line) corresponding to input connector T3, and the train (the 18th train) corresponding to C2. The connection relation of each unit is memorized similarly in the storage region 30.

[0017] A storage region 32 has the flag field made to correspond to each unit, and in case CPU22 searches a storage region 30, it is used so that it may mention later, and a flag is set to the flag field corresponding to the unit on the signal path of the signal outputted from the unit specified by the keyboard 22, and the signal path of the signal inputted into this unit.

[0018] It also displays the connection relation between each displayed unit on a display 24 while CPU22 searches the data of the storage region 30 of the storage means 28, detects the unit which exists in each signal path prolonged on the basis of the output side of the unit chosen by actuation of a keyboard 26 and displays the detection result on a display 24, when for example, double routing arises.

[0019] Therefore, CPU22 operates like the flow chart shown in drawing 2. First, a storage region 32 is cleared (step S2), and it judges whether one of units was specified by the keyboard (step S4). If not specified, step S4 will be repeated until decision becomes yes (when decision of step S4 is a no).

[0020] If decision of step S4 becomes yes (i.e., if one of units is chosen) The unit number (refer to drawing 3) assigned to the selected unit The pointer N used for assignment of the unit of the line of the storage region 32 prepared in CPU22 is made to memorize. A

flag is set to the flag field of the storage region 30 corresponding to the unit specified by this pointer N, and the unit which Pointer N specifies on a display 24 further is displayed on it (step S6). This selected unit serves as a radix point of retrieval.

[0021] and the value of Pointer N -- several 42 of all units -- 1 -- it judges whether it is equal to 43 [large], or it judges, namely, all the units were specified by Pointer N (step S8). decision of step S8 ends this processing as yes, coming out.

[0022] it judges whether the flag stands on the flag field which Pointer N specifies [decision of step S8] that no, it comes out in a memory area 32 (step S10). in order that this decision may start retrieval of the unit connected to the unit which this pointer N specifies that yes, it comes out, the value of the pointer I which specifies each train of a memory area 30 is set to 1 (step S12).

[0023] next, the value of Pointer I -- several 42 of all units -- 1 -- it is 43 [large] or judges whether the train of all units was specified (step S14). When this decision is a no, the flag stands on the N line I train of a memory area 30, or it judges whether the unit of N line and the unit of I train are connected (step S16).

[0024] this decision increases the value of Pointer I only for 1 as no, coming out -- making (step S18) -- step S14 -- decision of return and step S16 -- yes, steps S14, S16, and S18 are repeated until it comes to be alike.

[0025] decision of step S16 -- yes, coming out -- that is, since the unit specified by Pointer I means connecting with the unit specified previously when the unit of N line and the unit of I train are connected The unit specified by the pointer N which set the flag to the flag field corresponding to the unit specified by the pointer I in a memory area 32, displayed the unit which Pointer I specifies on a display 24, and was previously displayed as this is indicated by connection (step S20).

[0026] And step S18 or subsequent ones is performed. Therefore, if there is another unit connected to the unit specified by Pointer N, a flag will be similarly set to the flag field of the storage region 32 corresponding to the unit connected to this, and it will be displayed on a display 24, and will be indicated by connection with the unit specified by Pointer N.

[0027] Soon, after assignment of all the units by Pointer I is completed, only 1 will be enlarged (step S22) and the value of Pointer N will perform step S8 or subsequent ones (if the answer of step S14 becomes a no). Therefore, while the loop formation of steps S8, S10, and S22 is executed The unit which the value of Pointer N is enlarged every [1], and the flag stands on the flag field in the storage region 32 which Pointer N specifies as whenever [the], or Pointer N specifies it is judged whether it is the unit connected to the unit searched previously, the loop formation of steps S12, S14, S16, S18, and S20 is executed as coming out so, and the unit connected to this unit is searched.

[0028] For example, if input connector T3 is specified with a keyboard 26 as shown in drawing 4 , input connector T3 will be first displayed on an indicating equipment 24, then the input channel unit C2 will be displayed, and a connection indication of T3 and C2 will be given. Next, the group channel unit G1 is displayed and a connection indication of G1 and C2 is given. And the group channel unit G2 is displayed and a connection indication of G2 and C2 is given.

[0029] Next, the Maine channel unit M1 is displayed and a connection indication of G1 and M1 is given. And the Maine channel unit M1 is displayed again, and a connection indication of G2 and M1 is given. Each units which exist hereafter in the signal path which goes to the output connector side on the basis of input connector T3 similarly, and

these connection relation are displayed. And it becomes clear that double routing of the input channel unit C2 is carried out through the group channel units G1 and G2 from this display.

[0030] The 2nd example is shown in drawing 5 and drawing 6. Although each unit which exists in the signal path prolonged in an output side after this on the basis of the unit specified are clear from drawing 4 was displayed in the 1st example, each unit which exists in the signal path prolonged in an input side after this on the basis of the unit specified are clear from drawing 6 is displayed in the 2nd example. In addition, in drawing 6, it carries out on the basis of the Maine channel unit M1.

[0031] Therefore, although it was used for specifying a train in the 2nd example although it was used for Pointer N specifying the line of a storage region 32 in the 1st example, and it was similarly used for Pointer I specifying a train in the 1st example, in the 2nd example, it is used for specifying a line. Moreover, in the 2nd example, step S8a, S16a, and S22a are used to having used steps S8, S16, and S22 in the 1st example.

[0032] Step S8a judges whether the value of Pointer N is 0, and step S22a decreases the value of Pointer N every [1]. These are for searching from the unit made into the radix point to an input side.

[0033] Moreover, step S16a judges whether the flag stands on the field of the intersection of the line specified by the pointer I of a memory area 30, and the train specified by Pointer N. It is for also searching this from the unit made into the radix point to an input side.

[0034] Thus, if the Maine channel unit M1 is chosen by the keyboard 26 as shown in drawing 6 for example, since it is The Maine channel unit M1 is displayed first, and then the group channel unit G1 is displayed. A connection indication of M1 and G1 is given, next the group channel unit G2 is displayed, a connection indication of M1 and G2 is given, next group channel unit G3 is displayed and a connection indication of M1 and G3 is given. Each unit which exists in the signal path on the basis of the Maine channel unit M1 is hereafter displayed similarly to each input connector T1, T3, and T5, T7, T9, T10 and T11, and the connection condition between these is also displayed. Consequently, the input channel unit C2 is connected to the Maine channel unit M1 through the group channel units G1 and G2, and it becomes clear that double routing has arisen.

[0035] In addition, step S20 in both the above-mentioned examples can deform, as shown in drawing 7. If double routing has arisen, in step S16 or S16a, the flag already stands on the flag field of the storage region 32 corresponding to the unit (Pointer I specifies) judged to connect with the unit searched previously.

[0036] Then, in step S22 following step S16 or S16a, if it judged whether the flag would stand to the flag field of the memory area 32 corresponding to the unit specified by Pointer I and is standing on it, in step S24, it will indicate by connection with the unit as which it should differ and Pointer N specifies the display in the display 24 of the unit specified by this pointer I.

[0037] As a different display, as shown, for example in drawing 8, only a nit name shall be displayed on usual without displaying a frame, if each unit is enclosed by the frame and the nit name is displayed into it. moreover, a frame and (or) the nit name may be indicated by flashing.

[0038] moreover, decision of step S22 -- no, coming out -- that is, if it is not the part of double routing, the same processing as step S20 will be performed, and the usual display

will be performed (step S26).

[0039] In the 1st example, although each unit in the signal path prolonged in an output side from the unit used as a radix point was displayed and the unit in the signal path prolonged in an input side was displayed from the unit used as a radix point in the 2nd example, both can be displayed on coincidence.

[0040]

[Effect of the Invention] As mentioned above, since according to this invention it constituted so that each unit in the signal path prolonged from the selected unit might be displayed and the connection condition between each unit might be displayed, it can discover easily that double routing has arisen. Moreover, since it is surmised that that unit has caused double routing when the initial entry of each unit is searched and the already searched unit is searched again in order to display in this way, the part which double routing has produced more easily can be discovered by replacing the display of this unit with other things.

TECHNICAL FIELD

[Industrial Application] This invention relates to the display which displays the connection relation of each unit which constitutes this mixer equipment in the audio mixer equipment which mixes and outputs two or more audio frequency signals.

PRIOR ART

[Description of the Prior Art] There are some which connect various units as shown in drawing 9 in audio mixer equipment. In drawing 9, for T1 thru/or T16, as for an input channel unit, G1, or G5, an input connector, C1, or C8 is [a group channel unit M1, or M3] the Maine channel unit, and each of each [these] units has volume, the equalizer, the delay unit, etc. N1 and N2 are monitor channel units, and they have volume etc. O1 thru/or O8 are output connectors. As connection is carried out to arbitration according to an operating condition, for example, it is shown in drawing 9, connection of each [these] unit is carried out. Thus, this audio mixer equipment is equipped not only with each unit but with an input connector and an output connector, and this input connector and each unit can be connected, or it can also connect an output connector and each unit.

[0003] Thus, in order to show whether the output signal is supplied to which unit from each unit by which connection was carried out, respectively, each unit is made to correspond to each unit by which connection may be carried out, light emitting devices, such as light emitting diode, are prepared in it, and the light emitting diode corresponding to the unit by which connection was actually carried out is made to emit light.

[0004] For example, drawing 10 (a) shows the input channel unit C1, corresponding to the unit by which connection may be carried out, the group channel unit G1, or G5, a light emitting diode 1 thru/or 5 are prepared, and, now, the light emitting diode 1 corresponding to the group channel unit G1 by which connection is actually carried out is emitting light. Similarly, drawing 10 (b) shows the group channel unit G1, corresponding to the unit by which connection may be carried out, the Maine channel unit M1, or M3, a light emitting diode 6 thru/or 8 are prepared, and, now, the light emitting diode 6 corresponding to the Maine channel unit M1 by which connection is actually carried out

is emitting light. In addition, in both drawings, 9a and 9b are [an equalizer knob, and 11a and 11b of a volume knob, and 10a and 10b] delay-unit knobs.

[0005] However, with such audio mixer equipment, since many units are connected, double routing might arise. Double routing is that the same unit is supplied through the signal path from which the same signal differs as the Maine channel unit M1 is supplied through the group channel unit G2, while the output signal from the input channel unit C2 in drawing 9 is supplied to the Maine channel unit M1 through the group channel unit G1.

[0006] Since the allophone by which the input signal from input connector T3 is greatly reproduced unusually from the output connector O1, or the input signal from input terminal T3 by interference by the property difference of the group channel units G1 and G2 is reproduced by being distorted from the output connector O1 will be detected when it is the input channel unit C2 of drawing 9, for example if such double routing arises, it becomes clear that double routing has arisen in somewhere.

[0007] In this case, the monitor channel unit N1 to which the light emitting diode corresponding to the output connector O1 is emitting light among the monitor channel units N1 and N2 first is looked for. The monitor channel unit M1 to which the light emitting diode corresponding to the monitor channel unit N1 is furthermore emitting light the Maine channel unit M1 thru/or among M2 is looked for.

[0008] Such an activity is repeated successively, the output signal of the input channel unit C2 is supplied to the Maine channel unit M1 through the both sides of the group channel units G1 and G2 at last, and it becomes clear that double routing has arisen.

EFFECT OF THE INVENTION

[Effect of the Invention] As mentioned above, since according to this invention it constituted so that each unit in the signal path prolonged from the selected unit might be displayed and the connection condition between each unit might be displayed, it can discover easily that double routing has arisen. Moreover, since it is surmised that that unit has caused double routing when the initial entry of each unit is searched and the already searched unit is searched again in order to display in this way, the part which double routing has produced more easily can be discovered by replacing the display of this unit with other things.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, when it was looked for where double routing has arisen according to such an activity, connection had to be checked with slight accuracy one by one, and there was [which / of the light emitting diode of each unit / is emitting light, and] a trouble that the activity was very troublesome.

MEANS

[Means for Solving the Problem] A storage means by which the initial entry between two or more units from which this invention constitutes audio mixer equipment in order to solve the above-mentioned trouble is memorized, A retrieval means to search each unit

which exists in the signal path prolonged from the unit specified by assignment means to specify the thing of arbitration among each unit, and this assignment means from the initial entry of a storage means, A display means to display the connection relation between each of this searched unit and these units is provided.

[0011] Moreover, a retrieval means shall display the unit re-searched for the above-mentioned display means in the condition of having differed from the unit with which others were searched, when the already searched unit is searched again.

OPERATION

[Function] If the unit predicted to be in the signal path which double routing has produced is specified with an assignment means according to this invention, a retrieval means will discover each unit which exists in the signal path which searches the initial entry in a storage means and is prolonged from the specified unit. And the connection relation between each discovered unit and these units is displayed on a display means. Therefore, it can discover where double routing has arisen by seeing the connection relation between each of this unit currently displayed. Moreover, when a retrieval means searches the already searched unit again (i.e., when double routing has arisen), the unit which double routing has produced more simply can be discovered by displaying the unit re-searched for the display means in the condition of having differed from the unit with which others were searched.

EXAMPLE

[Example] The 1st example has the body 20 of an audio mixer, as shown in drawing 1. This body 20 of an audio mixer has the input connector T1 as shown in drawing 9 thru/or T16, the input channel unit C1 or C8, the group channel unit G1 or G5, the Main channel unit M1 or M3, the monitor channel units N1 and N2, the output connector O1, or O8. In addition, DSP (digital-signal-processing equipment) can constitute the body 20 of an audio mixer.

[0014] CPU22 is formed in addition to this body of audio mixer 20, and the display 24 constituted by CRT etc. is formed in this CPU22. Moreover, the storage means 28 which consisted of a keyboard 26, RAM, etc. is also formed in CPU22.

[0015] As shown in drawing 3, the table-like two storage regions 30 and 32 are established in the storage means 28. A storage region 30 is each unit (an input and an output connector are included.). It is constituted in the shape of [which has a line corresponding to an output side / being the same / and a train corresponding to the input side of each unit hereafter] a matrix, and the connection relation between each unit is expressed using such a matrix.

[0016] For example, when the input connector T1 and the input side of the input channel unit C1 are connected, A flag is set to the field of the intersection of the line (the 1st line) corresponding to T1, and the train (the 17th train) corresponding to C1. When input connector T3 and the input side of the input channel unit C2 are connected similarly, the flag is set to the field of the intersection of the line (the 3rd line) corresponding to input connector T3, and the train (the 18th train) corresponding to C2. The connection relation of each unit is memorized similarly in the storage region 30.

[0017] A storage region 32 has the flag field made to correspond to each unit, and in case CPU22 searches a storage region 30, it is used so that it may mention later, and a flag is set to the flag field corresponding to the unit on the signal path of the signal outputted from the unit specified by the keyboard 22, and the signal path of the signal inputted into this unit.

[0018] It also displays the connection relation between each displayed unit on a display 24 while CPU22 searches the data of the storage region 30 of the storage means 28, detects the unit which exists in each signal path prolonged on the basis of the output side of the unit chosen by actuation of a keyboard 26 and displays the detection result on a display 24, when for example, double routing arises.

[0019] Therefore, CPU22 operates like the flow chart shown in drawing 2 . First, a storage region 32 is cleared (step S2), and it judges whether one of units was specified by the keyboard (step S4). If not specified, step S4 will be repeated until decision becomes yes (when decision of step S4 is a no).

[0020] If decision of step S4 becomes yes (i.e., if one of units is chosen) The unit number (refer to drawing 3) assigned to the selected unit The pointer N used for assignment of the unit of the line of the storage region 32 prepared in CPU22 is made to memorize. A flag is set to the flag field of the storage region 30 corresponding to the unit specified by this pointer N, and the unit which Pointer N specifies on a display 24 further is displayed on it (step S6). This selected unit serves as a radix point of retrieval.

[0021] and the value of Pointer N -- several 42 of all units -- 1 -- it judges whether it is equal to 43 [large], or it judges, namely, all the units were specified by Pointer N (step S8). decision of step S8 ends this processing as yes, coming out.

[0022] it judges whether the flag stands on the flag field which Pointer N specifies [decision of step S8] that no, it comes out in a memory area 32 (step S10). in order that this decision may start retrieval of the unit connected to the unit which this pointer N specifies that yes, it comes out, the value of the pointer I which specifies each train of a memory area 30 is set to 1 (step S12).

[0023] next, the value of Pointer I -- several 42 of all units -- 1 -- it is 43 [large] or judges whether the train of all units was specified (step S14). When this decision is a no, the flag stands on the N line I train of a memory area 30, or it judges whether the unit of N line and the unit of I train are connected (step S16).

[0024] this decision increases the value of Pointer I only for 1 as no, coming out -- making (step S18) -- step S14 -- decision of return and step S16 -- yes, steps S14, S16, and S18 are repeated until it comes to be alike.

[0025] decision of step S16 -- yes, coming out -- that is, since the unit specified by Pointer I means connecting with the unit specified previously when the unit of N line and the unit of I train are connected The unit specified by the pointer N which set the flag to the flag field corresponding to the unit specified by the pointer I in a memory area 32, displayed the unit which Pointer I specifies on a display 24, and was previously displayed as this is indicated by connection (step S20).

[0026] And step S18 or subsequent ones is performed. Therefore, if there is another unit connected to the unit specified by Pointer N, a flag will be similarly set to the flag field of the storage region 32 corresponding to the unit connected to this, and it will be displayed on a display 24, and will be indicated by connection with the unit specified by Pointer N.

[0027] Soon, after assignment of all the units by Pointer I is completed, only 1 will be

enlarged (step S22) and the value of Pointer N will perform step S8 or subsequent ones (if the answer of step S14 becomes a no). Therefore, while the loop formation of steps S8, S10, and S22 is executed The unit which the value of Pointer N is enlarged every [1], and the flag stands on the flag field in the storage region 32 which Pointer N specifies as whenever [the], or Pointer N specifies it is judged whether it is the unit connected to the unit searched previously, the loop formation of steps S12, S14, S16, S18, and S20 is executed as coming out so, and the unit connected to this unit is searched.

[0028] For example, if input connector T3 is specified with a keyboard 26 as shown in drawing 4 , input connector T3 will be first displayed on an indicating equipment 24, then the input channel unit C2 will be displayed, and a connection indication of T3 and C2 will be given. Next, the group channel unit G1 is displayed and a connection indication of G1 and C2 is given. And the group channel unit G2 is displayed and a connection indication of G2 and C2 is given.

[0029] Next, the Maine channel unit M1 is displayed and a connection indication of G1 and M1 is given. And the Maine channel unit M1 is displayed again, and a connection indication of G2 and M1 is given. Each units which exist hereafter in the signal path which goes to the output connector side on the basis of input connector T3 similarly, and these connection relation are displayed. And it becomes clear that double routing of the input channel unit C2 is carried out through the group channel units G1 and G2 from this display.

[0030] The 2nd example is shown in drawing 5 and drawing 6 . Although each unit which exists in the signal path prolonged in an output side after this on the basis of the unit specified are clear from drawing 4 was displayed in the 1st example, each unit which exists in the signal path prolonged in an input side after this on the basis of the unit specified are clear from drawing 6 is displayed in the 2nd example. In addition, in drawing 6 , it carries out on the basis of the Maine channel unit M1.

[0031] Therefore, although it was used for specifying a train in the 2nd example although it was used for Pointer N specifying the line of a storage region 32 in the 1st example, and it was similarly used for Pointer I specifying a train in the 1st example, in the 2nd example, it is used for specifying a line. Moreover, in the 2nd example, step S8a, S16a, and S22a are used to having used steps S8, S16, and S22 in the 1st example.

[0032] Step S8a judges whether the value of Pointer N is 0, and step S22a decreases the value of Pointer N every [1]. These are for searching from the unit made into the radix point to an input side.

[0033] Moreover, step S16a judges whether the flag stands on the field of the intersection of the line specified by the pointer I of a memory area 30, and the train specified by Pointer N. It is for also searching this from the unit made into the radix point to an input side.

[0034] Thus, if the Maine channel unit M1 is chosen by the keyboard 26 as shown in drawing 6 for example, since it is The Maine channel unit M1 is displayed first, and then the group channel unit G1 is displayed. A connection indication of M1 and G1 is given, next the group channel unit G2 is displayed, a connection indication of M1 and G2 is given, next group channel unit G3 is displayed and a connection indication of M1 and G3 is given. Each unit which exists in the signal path on the basis of the Maine channel unit M1 is hereafter displayed similarly to each input connector T1, T3, and T5, T7, T9, T10 and T11, and the connection condition between these is also displayed. Consequently, the

input channel unit C2 is connected to the Main channel unit M1 through the group channel units G1 and G2, and it becomes clear that double routing has arisen.

[0035] In addition, step S20 in both the above-mentioned examples can deform, as shown in drawing 7 . If double routing has arisen, in step S16 or S16a, the flag already stands on the flag field of the storage region 32 corresponding to the unit (Pointer I specifies) judged to connect with the unit searched previously.

[0036] Then, in step S22 following step S16 or S16a, if it judged whether the flag would stand to the flag field of the memory area 32 corresponding to the unit specified by Pointer I and is standing on it, in step S24, it will indicate by connection with the unit as which it should differ and Pointer N specifies the display in the display 24 of the unit specified by this pointer I.

[0037] As a different display, as shown, for example in drawing 8 , only a nit name shall be displayed on usual without displaying a frame, if each unit is enclosed by the frame and the nit name is displayed into it. moreover, a frame and (or) the nit name may be indicated by flashing.

[0038] moreover, decision of step S22 -- no, coming out -- that is, if it is not the part of double routing, the same processing as step S20 will be performed, and the usual display will be performed (step S26).

[0039] In the 1st example, although each unit in the signal path prolonged in an output side from the unit used as a radix point was displayed and the unit in the signal path prolonged in an input side was displayed from the unit used as a radix point in the 2nd example, both can be displayed on coincidence.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram of the 1st example of this invention.

[Drawing 2] It is the flow chart of this 1st example.

[Drawing 3] It is drawing showing the contents of the memory used in this 1st example.

[Drawing 4] It is drawing showing the display in this 1st example.

[Drawing 5] It is the flow chart of this 2nd example.

[Drawing 6] It is drawing showing the display in this 2nd example.

[Drawing 7] It is the flow chart of the modification of these 1st and 2nd examples.

[Drawing 8] It is drawing showing the display in the modification of drawing 8 .

[Drawing 9] It is drawing showing the connection condition of each unit in audio mixer equipment.

[Drawing 10] It is the front view of the unit currently used for conventional audio mixer equipment.

[Description of Notations]

20 Audio Mixer Equipment

22 CPU (Retrieval Means)

24 Display (Display Means)

26 Keyboard (Assignment Means)

28 Storage Means